

# Arctic winter warming causes cold damage in the subtropics of East Asia

February 8 2022

---



Melting ice on the islands of Severnaya Zemlya (Barents and Laptev Sea region).  
Credit: Gabriela Schaeppman-Strub, Arctic Century Expedition, 2021

Due to climate change, Arctic winters are getting warmer. An international study by UZH researchers shows that Arctic warming

causes temperature anomalies and cold damage thousands of kilometers away in East Asia. This in turn leads to reduced vegetation growth, later blossoming, smaller harvests and reduced CO<sub>2</sub> absorption by the forests in the region.

Switzerland has had relatively little snow so far this winter, but last year was different: Trains and trams stopped running, and tree branches broke under the heavy weight of the snow. During the past few days, the east coast of the United States experienced heavy snowfall and low temperatures as far south as Florida.

Warmer Arctic winters are now also triggering extreme winter weather of this kind in East Asia, an international team of researchers from Switzerland, Korea, China, Japan and the United Kingdom has found. The cooler southern winters reduce vegetation activity in the evergreen subtropics, and continue to negatively affect ecosystems in the spring, for example due to branches broken under heavy snowfall or frost-damaged leaves. First author Jin-Soo Kim of the Department of Evolutionary Biology and Environmental Studies at the University of Zurich says: "The cooler winters also reduce agricultural productivity of cereals, fruits, root vegetables, and legumes."

## **Globally connected weather events**

The scientists combined earth system modeling, satellite data and local observations for the study. They also analyzed an index of sea surface temperatures from the Barents-Kara Sea and found that in years with higher than average Arctic temperatures, changes in atmospheric circulation resulted in an anomalous [climate](#) throughout East Asia. In particularly cold years, the unfavorable conditions adversely affected vegetation growth and crop yields, and delayed blossoming. Moreover, the researchers estimated a decrease in carbon uptake capacity in the region of 65 megatons of carbon during [winter](#) and spring (by way of

comparison, fossil fuel emissions in Switzerland are 8.8 megatons of carbon per year). The reduction in carbon absorption capacity caused by climate change is thus another issue that must be taken into account when discussing carbon neutrality.



The rapidly melting ice caps on the islands of Severnaya Zemlya leave behind landscapes like those on Mars. Credit: Jón Björgvinsson © 2021 Swiss Polar Institute (CC BY 4.0), Arctic Century Expedition, 2021

## **Climate change causes ecological and socioeconomic damage**

The warming of the Arctic caused by human greenhouse gas emissions is causing social and economic harm to humans as far south as the

subtropics. Gabriela Schaepman-Strub, co-author of the study, says: "This study highlights how complex the effects of [climate change](#) are. While we observe strong warming in the Arctic system, especially over the Barents-Kara Sea, we have now discovered that this warming affects ecosystems thousands of kilometers away and over multiple weeks through climate teleconnections. Arctic warming is not only threatening the polar bear, but will affect us in many other ways."

**More information:** Jin-Soo Kim et al, Arctic warming-induced cold damage to East Asian terrestrial ecosystems, *Communications Earth & Environment* (2022). [DOI: 10.1038/s43247-022-00343-7](https://doi.org/10.1038/s43247-022-00343-7)

Provided by University of Zurich

Citation: Arctic winter warming causes cold damage in the subtropics of East Asia (2022, February 8) retrieved 25 June 2024 from <https://phys.org/news/2022-02-arctic-winter-cold-subtropics-east.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.